

# The Bursidae, Cymatiidae and Colubrariidae of Fiji

(Mollusca : Gastropoda)

BY

WALTER OLIVER CERNOHORSKY

Vatukoula, Fiji Islands

(Plates 42 to 46; 14 Text figures)

THIS ACCOUNT COVERING the families Bursidae, Cymatiidae and Colubrariidae is the sixth faunal monograph dealing with Fiji mollusca. Only those species collected by resident collectors and the author have been taken into consideration.

Species of all three families have a wide distribution, living in warm waters of all major oceans. Further records of species are to be expected, especially for those of the Colubrariidae which at present are represented by only two species from Fiji.

For notes on the geography of the Fiji Islands and other pertinent data see CERNOHORSKY (1964).

## The Animal, Habitat and Variation

The foot is comparatively small, round and short, but solid and powerful in the Bursidae. Tentacles are moderately short, eyes are small and situated on the outside of the thickened base of the tentacles. Siphon is short, proboscis slender and moderately long. The animals of Cymatiidae are rather similar, but generally more colorful. Animals are fairly agile and move swiftly. An operculum is present in species of all three families, a hairy periostracum in the Cymatiidae.

Sexes are separate. The radula is taenioglossate, with seven teeth per row, and similar to the Cassidae. The Bursidae appear to have evolved from a tonnaeid ancestor during Upper Cretaceous or Paleocene times; the Cymatiidae and Colubrariidae are of a somewhat more recent origin.

Species of the three families are primarily reef dwellers, although some species of Cymatidae are found on sandy, broken coral substrate. They inhabit shallow water of the intertidal zone but also live in deeper water. Muddy sand localities appear to be their preferred habitat.

Species of Bursidae, Cymatidae and Colubrariidae appear to be less variable than other molluscan groups,

although they display a limited range of variation in sculpture and colour. The number of denticles on the labial lip would appear to be almost of the same diagnostic value as the labial teeth in Cypraeidae; the columellar plicae, however, display a greater range. Ecological variation is minimal, and far less pronounced than is the case in Cypraeidae and Conidae.

## The Genera

Species of these three families were combined under the genus *Murex* by LINNAEUS (1758) and GMELIN (1791). RÖDING (1798), however, was more discriminating and distributed the species among his new genera *Bursa*, *Cahestana*, *Cymatium*, *Distorsio* and *Tritonium* (non MÜLLER, 1776). During the 19th century many new genera were established, and the genera *Triton* MONTFORT, 1810 (non LINNAEUS, 1758) and *Ranella* LAMARCK, 1816, were widely used for the reception of the "Triton" species. By the time DALL (1904) and BAYER (1932, 1933) wrote their respective revisions of the Bursidae and Cymatiidae, about 70 generic names had been established for the two families which contain only a limited number of species; the majority of genera, in the light of present day evidence, are objective or subjective synonyms.

## ACKNOWLEDGMENTS

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#### BURSIDAE

##### *Bursa* RÖDING, 1798

*Bursa* RÖDING, 1798, Mus. Bolten., p. 128 - Type species by SD (JOUSSEAUME, 1881) *Bursa monitata* RÖDING, 1798 = *Bursa bufonia* (GMELIN, 1791).

**Characteristics:** Shell ovate, ventricose or flatly compressed at times, whorls convex and angulate, varices continuous or discontinuous, one or two at every whorl; shells with a coarse sculpture of spiral and axial cords and prominent knobs between varices. Labrum and columella calloused and dentate or plicate, anal canal prominent and occasionally with produced appendages; siphonal canal short, sometimes recurved. Periostracum almost obsolete or absent.

Operculum brown, orange-brown or yellowish-brown, thick or moderately thin, triangular, with long side rounded or regularly ovate and narrowing anteriorly, sometimes angulate. Nucleus either a: sub-lateral to the left, at centre of margin or slightly below; b: terminal or slightly offset to the right; or c: terminal but well away from margin or slightly offset to the right.

**Animal:** Foot short but powerful, tentacles moderately short and slightly recurved, generally cross-banded, eyes moderately small and situated on outer edges of thickened base of tentacles, siphon short, proboscis slender and moderately long.

**Radula:** Rhachidian trapezoidal in outline, with one long central cusp and a few small side-cusps, two prominent curved cusps situated on the interior margin of the plate; this last feature is absent in all genera of the Cymatiidae. Laterals with two to four cusps on the cutting edge, inner marginals with one cusp or without, outer marginals without accessory cusps.

**Egg-Mass:** Egg capsules encased in a gelatinous matrix and thus differ from the Cymatiidae which deposit capsules directly onto the substrate without a protective jelly-mass covering.

**Discussion:** The familial position of *Bursa* RÖDING has had an eventful history, as the genus has been placed in

the Tritoniidae (19th century authors), Bursidae (KURODA & HABE, 1952), Ranellidae (HABE, 1961), and Cymatiidae (GARRARD, 1961). Bursid species have, more often than not, been associated with the genus *Ranella* LAMARCK, 1816, and DALL (1904) and THIELE (1929) list *Murex bufonius* GMELIN, 1791, as the type species of *Ranella*. DELL & DANCE (1963) reviewed the taxonomy of the genus *Ranella* and correctly concluded that *Ranella gigantea* LAMARCK, 1816 (= *Murex olearium* LINNAEUS, 1758) is the type species of *Ranella* LAMARCK. LAMARCK's inclusion and delineation of nine nominal species in the genus *Ranella* (1816, pls. 412-414) precludes a type designation by monotypy (*vide* DELL & DANCE, 1963) or by subsequent monotypy (*vide* DALL, 1904, and HEPPELL, 1964), but rather by subsequent designation by CHILDREN (1823).

The familial separation of *Bursa* RÖDING from the family Cymatiidae is most appropriate in view of the type of spawn of *Bursa*. The egg mass is that of a more primitive mesogastropod, and would suggest a retarded stage of development of the Bursidae in comparison with some genera of the more advanced Cymatiidae. According to ANDERSON (1960) and the Hawaiian Shell News (1961, 1966) certain species of the genera *Mayena* IREDALE, 1917, *Cymatilesta* IREDALE, 1936 (= *Cabestana* RÖDING, 1798) and *Charonia* GISTEL, 1848, deposit egg-capsules directly onto the substrate without the egg cluster being encased in a solid gelatinous matrix (see under *Bursa granularis* RÖDING).

##### 1. *Bursa bubo* (LINNAEUS, 1758)

(Plate 42, Figure 1)

1758. *Murex rana bubo* β LINNAEUS, Syst. Nat., ed. 10, p. 748, no. 452

1798. *Tritonium bufo* RÖDING, Mus. Bolten., p. 128, no. 1647

1822. *Triton nodiferum* LAMARCK, Anim. sans Vert., 7: 179

1914. *Bursa* (*Tutufa*) *rubeta* var. *gigantea* E. A. SMITH, Journ. Conch. 14: 230

**Shell:** Shell large and heavy, inflated; creamy-white or yellowish-brown, sparsely flecked with irregular dark brown patches or spiral rows of spots. Whorls convex, angulate, numbering 8-9 apart from protoconch; varices number two at every whorl, body whorl sculptured with prominent spiral cords and intermediate nodulose spiral lirae, and 6-8 prominent knobs are situated between varices on body whorl. Aperture wide, outer lip flaring, and with 20-25 small brown denticles at edge of lip, and 10-12 white denticles further towards the interior of the aperture; columella calloused, and with 28-34 plicae which extend to the parietal wall. Anal canal

short, siphonal canal calloused and only moderately produced, deep interior of aperture white or light yellow.

**Size:** 128 to 258 mm.

**Habitat:** Under coral rocks, on sand and coral substrate, in shallow and deeper water.

Uncommon.

**Distribution:** South and Southwest Viti Levu, Yasawa Islands. – From East Africa through the tropical Indo-Pacific to Polynesia and the Hawaiian Islands.

**Discussion:** In Fiji specimens examined, the colour of the aperture and columella varied from white to light orange.

### 2. *Bursa bufonia* (GMELIN, 1791)

(Plate 42, Figure 4)

1758. *Murex rana* LINNAEUS (pars), Syst. Nat., ed. 10, p. 748, no. 451

1791. *Murex bufonius* GMELIN, Syst. Nat., ed. 13, p. 3534 (non *Bursa bufonia* RÖDING, 1798)

1798. *Bursa mammata* RÖDING, Mus. Bolten., p. 128

1798. *Bursa monitata* RÖDING, Mus. Bolten., p. 129

1807. *Gyrineum bufonium* LINK, Besch. Nat.-Samml. Univ. Rostock, p. 123

1964. *Bursa leo* SHIKAMA, Sel. shells world, 2: 115, pl. 62, fig. 10 & text fig. 194 - upper figure (immature specimen)

**Shell:** Shell moderate in size, ponderous and heavy; creamy-white in colour, ornamented with brown lines and blotches, but generally heavily encrusted with lime and foraminifera. Whorls number 5, apart from protoconch which was missing in specimens examined; there are 2 varices at each whorl, and they are generally in vertical alignment; 2 - 3 heavy knobs are situated between varices, and body whorl is sculptured with 3 - 4 coarse spiral ridges and smaller obsolete nodulose cords. Aperture white, outer edge of labial lip cream in colour and often with a greenish tint; outer lip with 10 - 11 prominent white denticles. Columella calloused, outer edge cream-coloured, columellar wall white, sculptured with 28 - 32 white and close-set plicae, and a blunt larger denticle near the anal canal. Siphonal canal short, anal canal moderately produced, interior of aperture porcelain white.

**Size:** 50 to 70 mm.

**Habitat:** Under coral rocks, on solid reef substrate, in shallow and deeper water.

Moderately rare.

**Distribution:** West Viti Levu. – From Mauritius through the tropical Indo-Pacific to Polynesia and the Hawaiian Islands.

**Discussion:** The close-set, numerous and almost regular columellar plicae are an outstanding feature in this species.

### 3. *Bursa cruentata* (SOWERBY, 1835)

(Plate 43, Figure 7)

1835. *Ranella cruentata* SOWERBY, Conch. Illust., *Ranella*, pl. 85, figs. 5, 5\*

1841. *Ranella cruentata*, SOWERBY, Proc. Zool. Soc. London, p. 51

**Shell:** Shell moderately small and solid; dirty-white to creamy-yellow in colour, occasionally ornamented with a few isolated lilac spots on nodules. Whorls number from 5 - 6, each whorl with 2 varices, protoconch missing in specimens examined. The shell is heavily sculptured with nodulose spiral cords of varying size, and 3 - 4 large double knobs between varices on body whorl; there are 4 such knobs on the penultimate and earlier whorls. Aperture white in colour, outer lip slightly expanded, and sculptured with 9 - 10 white denticles and 3 small expanding digits; anal canal short. Columella with 5 - 12 white denticles, columellar wall with cords which extend from body whorl inside aperture; the columella is ornamented with 4 - 5 close-set, short and dark chocolate-brown bars. Parietal wall with 1 - 2 small denticles, siphonal canal moderately short and fairly open.

**Size:** 22 to 40 mm.

**Habitat:** Under coral rocks in shallow water.

Moderately rare.

**Distribution:** South and West Viti Levu. – From South Africa through the tropical Indo-Pacific to Polynesia, the Hawaiian and Clipperton Islands.

### 4. *Bursa granularis* (RÖDING, 1798)

(Plate 42, Figure 6; Plate 43, Figure 11; Text figures 1-3)

1798. *Tritonium jabick* RÖDING, Mus. Bolten., p. 127

1798. *Tritonium granulare* RÖDING, Mus. Bolten., p. 127

1816. *Ranella granifera* LAMARCK, Tabl. Encyc. Méth., p. 4, pl. 414, fig. 4

1822. *Ranella semigranosa* LAMARCK, Anim. sans Vert., 7: 153

1832. *Ranella affinis* BRODERIP, Proc. Zool. Soc. London, p. 179

1844. *Ranella livida* REEVE, Conch. Icon., pl. 6, sp. 28

1880. *Ranella fijiensis* WATSON, Journ. Linn. Soc. London 15: 270

1886. *Ranella fijiensis*, WATSON, Voy. H. M. S. Challenger, pt. 42, p. 397, pl. 34, fig. 7

1932. *Bursa alfredensis* TURTON, Mar. shells Pt. Alfred, p. 107, pl. 24, no. 781

**Shell:** Shell moderate in size, laterally compressed; variable in colouring, but generally light orange-brown or dark reddish-brown, with occasional light-coloured spiral lines and flecks on varices. Whorls convex, numbering 6 apart from protoconch of 3 orange-brown smooth nuclear whorls; two varices at each whorl, and these are generally in vertical alignment. Body whorl sculptured with 11 - 16 spiral rows of nodules, some larger than others, penulti-

mate whorl with 5-6 rows of nodules; interstices of nodules finely spirally striate, axial striae very faint. Aperture white or creamy-white, outer lip with 14-16 white denticles; columella and columellar wall with 17 to 23

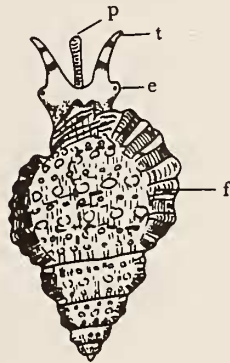


Figure 1

*Bursa granularis* (RÖDING). Fiji Islands.

Animal and Shell

p - Proboscis    t - Tentacles    e - Eyes    f - Foot

denticles which extend as plicae into the aperture; parietal wall with 1-2 denticles. Siphonal and anal canals short but fairly deep.

**Animal:** Foot creamy-white, siphon white and longitudinally lined with dark grey; tentacles moderately short in comparison with shell-length, banded with 2 blackish zones consisting of short and close-set longitudinal lines; eyes moderately small, blackish-grey in colour.

**Radula:** Radular ribbon translucent creamy-white, measuring 5.1 mm in length and 0.6 mm in width in an animal with a shell 42 mm in length; ribbon has 52 fully formed rows of teeth (+ 7 nascentes), and the first rows of teeth are worn. Rhachidian roughly trapezoidal in outline,

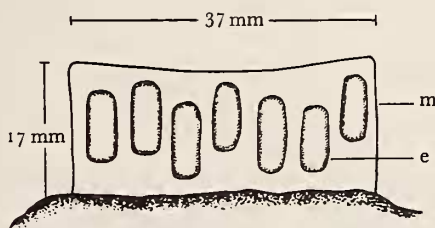


Figure 2

*Bursa granularis* (RÖDING). Fiji Islands.

Lateral View of Egg Mass

m - Gelatinous Matrix    e - Egg Capsules

broader than long, with a moderately long and massive central cusp; prominent inward pointing cusps are situated on the interior margins of the central plate; the central cusp is flanked by three small denticles on either side, but the number of side-denticles is variable, generally not exceeding four on either side. Lateral is massive and beak-shaped, and equipped with 2-3 accessory cusps on the cutting edge; the inner and outer marginals are sickle-shaped and carry no denticles.

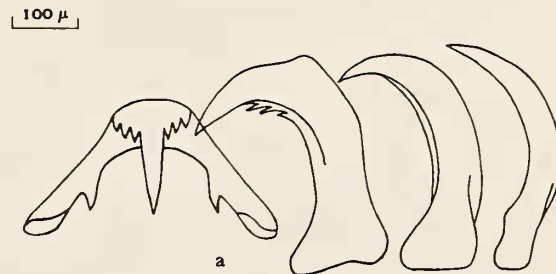


Figure 3

*Bursa granularis* (RÖDING). Fiji Islands.

a. Half Row of Radular Teeth

b. Operculum

**Egg-Mass:** The egg-mass consists of a solid translucent gelatinous matrix, oval in outline, measuring 37 mm in length, 30 mm in width and 17 mm in height. The jelly-mass is fairly regular and smooth, with the top prominently concave. Egg-capsules are flatly cylindrical, bright yellow in colour, feathery, and measure 8 mm by 9 mm in height; the 28 capsules counted were well-spaced, suspended on edge and completely embedded in the matrix, which was firmly attached to the underside of a coral rock.

**Size:** 35 to 53 mm.

**Habitat:** Under coral rock on sand and reef substrate, in shallow and deeper water; preferred habitat is muddy-sand environment.

Common.

**Distribution:** Throughout the Fiji Islands. – From East Africa through the tropical Indo-Pacific to Polynesia, the Hawaiian and Clipperton Islands, Southeast Florida and the West Indies.

**Discussion:** IREDALE in 1931 established the genus *Dulcerana* specifically for the species *Bursa granifera* (LAMARCK), which he synonymized with *Bursa granularis* (RÖDING) and *B. jabick* (RÖDING). IREDALE's new genus name, however, is a *nomen nudum*.

5. *Bursa nobilis* (REEVE, 1844)

(Plate 42, Figure 5; Text figure 4)

1844. *Ranella nobilis* REEVE, Conch. Icon., *Ranella*, pl. 4, sp. 16  
1931. *Gyrineum pacator* IREDALE, Rec. Austral. Mus., 18: 214, pl. 23, fig. 3

**Shell:** Shell moderate in size, solid and moderately heavy; creamy-white to fawn in colour, sparsely ornamented with small rusty-brown blotches and spots or spiral lines.

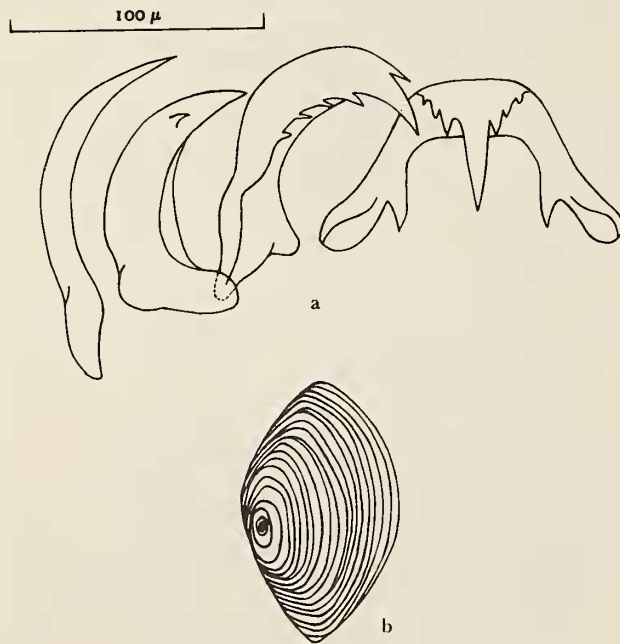


Figure 4

*Bursa nobilis* (REEVE). Fiji Islands.

a. Half Row of Radular Teeth

b. Operculum

Whorls convex, numbering from 4 - 6 apart from protoconch of 3 smooth nuclear whorls; varices number 2 at every whorl and are in vertical alignment; prominent

flat and slightly triangular knobs are positioned between varices on the dorsal side of the body whorl, while from the ventral view 2 - 4 knobs are visible between varices. Sculpture consists of 15 - 16 nodulose spiral ridges on the body whorl and 5 - 7 ridges on the penultimate whorl; interstices are finely axially striate and ornamented with smaller satellite cords. Outer lip yellow or orange at edge, sculptured with 12 - 16 white denticles which are often elongate; columella heavily calloused, yellow or orange at outer edge, sculptured with 13 - 21 white denticles which become plicae on the columellar wall; parietal wall with 1 or 2 prominent denticles and sometimes 1 or 2 smaller denticles. Siphonal canal short, anal canal moderately produced, interior of aperture white.

**Radula:** Radular ribbon translucent white, 3.1 mm long and 0.3 mm wide in an animal with a shell 42.0 mm in length; fully formed rows number 58 (+ 5 nascentes), and wear on teeth was visible in the first 10 anterior rows. Rhachidian is of the *Bursa* pattern, with 1 prominent central cusp which is flanked by 3 smaller side-cusps; single prominent cusps emanate from the interior edge of the plate. Laterals with 4 small cusps on each side of the cutting edge, the first cusp being the largest; inner marginal with 1 cusp, outer marginal sickle-shaped and without cusps.

**Size:** 24 to 57 mm.

**Habitat:** Under coral rocks on sand and reef substrate, in shallow and deeper water.

Uncommon.

**Distribution:** Throughout the Fiji Islands. – From the Philippine Islands to Polynesia.

**Discussion:** In all specimens examined, one of the knobs on the dorsal side of the body whorl was appreciably larger than the others, and prominently compressed.

6. *Bursa rhodostoma* (SOWERBY, 1835)

(Plate 43, Figure 9; Text figure 5)

1835. *Ranella rhodostoma* SOWERBY, Conch. Illust., *Ranella*, pl. 88, fig. 10

**Shell:** Shell small and solid; creamy-white or light yellow in colour, generally well encrusted with lime. Whorls angulate, numbering 5 apart from protoconch which is generally missing; varices are in vertical alignment and number 2 at every whorl; 2 - 3 prominent fused knobs are situated between varices. The body whorl is sculptured with 3 coarse spiral ridges and 2 - 3 additional spiral rows of nodules; interstices with very fine spiral and axial striae. Aperture wine-coloured, outer lip somewhat expanded, flattened and foliated, ornamented with 8 - 9

small white denticles; columella calloused, ornamented with scattered white denticles and nodules on a wine-coloured background. Siphonal canal very short.

**Size:** 10 to 25 mm.

**Habitat:** On broken coral substrate, from 0 - 15 fathoms.

Moderately rare.

**Distribution:** South and West Viti Levu. - From the Philippine Islands through the tropical Pacific to the Hawaiian Islands.



Figure 5

Operculum of *Bursa rhodostoma* (SOWERBY). Fiji Islands.

**Discussion:** *Bursa venustula* (REEVE, 1844) is a similar species, but is generally slightly larger, the columella bears numerous elongated and irregular plicae, the labial lip is not flattened and expanded beyond the denticles as is the case in *B. rhodostoma*; the anal canal is generally longer than in *B. rhodostoma*. The species *B. venustula* appears to be confined to Polynesia and has been recorded from Baker Island, Canton Island and Christmas Island (Dr. H. Rehder, *in litt.*).

#### 7. *Bursa rosa* PERRY, 1811

(Plate 42, Figure 3; Text figure 6)

1811. *Bursa rosa* PERRY, Conchology, pl. 4, fig. 1

1844. *Ranella siphonata* REEVE, Conch. Icon., *Ranella*, pl. 7, sp. 38

1961. *Bursa mammata* RÖDING, HABE, Col. illust. shells Japan 2: 47, pl. 24, fig. 2 (non RÖDING, 1798)

1963. *Bursa (Bursa) mammata* RÖDING, SHIKAMA, Sel. shells world, 1: 64, pl. 49, fig. 4 (non RÖDING, 1798)

**Shell:** Shell moderate in size, solid and heavy; dirty-grey or creamy-yellow in colour, occasionally ornamented with small patches of purplish-brown on nodules and varices. Whorls number 5-6 apart from protoconch, sutures indistinct; there is one varix at every whorl, and siphonal appendages emanate from varices at the junction of columella and labrum. Whorls with 2-4 prominent knobs between varices on the ventral surface, and 2-3 knobs on the dorsal surface; ultimate knobs are connected with the outer lip and varix by 3-4 elevated and coarse spiral

ridges; prominent axial ridges descend onto nodules. Edge of outer lip and columella yellowish, outer lip with 8-10 whitish denticles which are generally arranged in pairs, and more or less confined to the edge of the lip. Columella

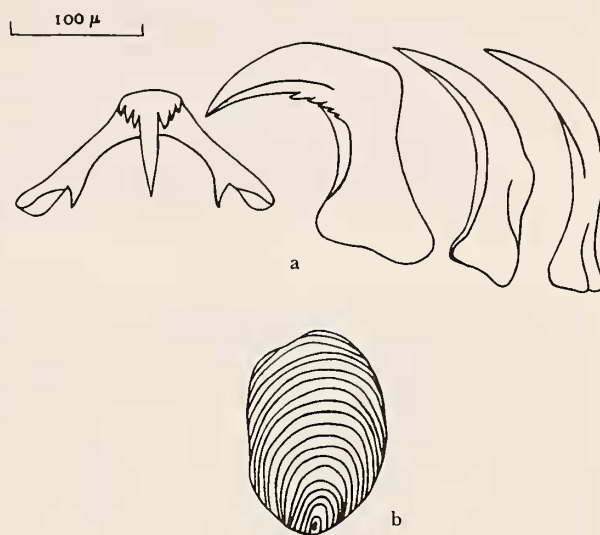


Figure 6

*Bursa rosa* PERRY. Fiji Islands.

a. Half Row of Radular Teeth

b. Operculum

wine-coloured, with 1-3 prominent whitish plicae posteriorly and 3-6 denticles anteriorly; remainder of columella with 9-16 rather obsolete plicae extending towards the purplish-brown or wine-coloured interior. Anterior canal short and truncated.

**Radula:** Radular ribbon translucent white, 5.7 mm in length and 0.48 mm in width in an animal with a shell 40.0 mm in length; fully formed rows number 69 (+6 nascentes) and the first 12 anterior rows show appreciable wear. Rhachidian of *Bursa* pattern, with a long and prominent central cusp which is flanked by 3 side-cusps; a prominent cusp is positioned on the interior edge of the plate. Lateral with 5 cusps on cutting edge, inner and outer marginals sickle-shaped and without cusps.

**Size:** 25 to 50 mm.

**Habitat:** Under coral rocks, on sand and coral substrate, in shallow and deeper water.

Uncommon.

**Distribution:** Throughout the Fiji Islands. - From the Philippine Islands through the tropical Pacific to the Hawaiian Islands.

8. *Bursa* species

(Plate 42, Figure 2)

1963. *Bursa (Bursa) bufonia* (GMELIN), SHIKAMA, Sel. shells world, 1: 64, pl. 49, fig. 1 (non *Murex bufonius* GMELIN, 1791)

**Shell:** Shell moderate in size, solid and somewhat compressed; cream in colour, ornamented with large and small areas of white, yellow and purple, and occasional brown spiral zones. Whorls angulate, numbering 6 apart from protoconch; varices are vertically aligned and number 2 at every whorl, 2-3 prominent knobs are situated between varices. Sculpture consists of 5-6 coarse spiral cords which are more prominent near varices, and axial ridges tend to be obsolete in large specimens. Outer lip dark purple or purple-brown, ornamented with 9-10 cream-coloured denticles which persist as plicae for some distance towards the interior of aperture. Columella deep purple or chocolate-brown, sculptured with 20-21 whitish or creamy plicae which extend around pillar and towards the parietal wall; the later bears a prominent plica and 2-3 small denticles. Siphonal canal short, anal canal produced and visible on 2-3 whorls; deep interior of aperture white.

**Size:** 40 to 73 mm.

**Habitat:** Under coral rocks on sand and coral substrate, generally in deeper water.

Uncommon.

**Distribution:** Throughout the Fiji Islands. - Japan.

**Discussion:** This species has been generally united with *Bursa bufonia* (GMELIN) and appears to be nameless. DESHAYES (1843, p. 546) separated this distinct species but did not provide a name for it. Workers with a comprehensive library at their disposal could verify that the species is indeed nameless and provide it with a name.

## CYMATIDAE

*Cymatium* RÖDING, 1798

*Cymatium* RÖDING, 1798, Mus. Bolten., p. 129 - Type species by SD (DALL, 1904) *Cymatium femorale* (LINNAEUS, 1758)

**Characters:** Shells moderately small to large, generally fairly solid, ovate and ventricose, whorls few, convex or angulate, varices prominent and discontinuous; whorls generally sculptured with spiral cords, axial ridges, nodules and knobs. Labial lip and columella calloused, denti-

culate or plicate, anal canal obsolete, siphonal canal moderately short or very long, slender or broad, recurved or twisted. Periostracum yellowish-brown to dark brown and with hair-like projections.

Operculum is variable, but generally orange-brown in colour and thick, slender or broadly ovate, sometimes triangular with the long side rounded, or narrowing posteriorly. Nucleus either a: terminal and at edge of margin or slightly offset to the right; and b: central and slightly offset towards terminal margin; or c: submarginal to the left and slightly below centre.

The animal is similar to that of *Bursa* RÖDING, but marked with colourful round, elliptical, trigonal or hexagonal spots.

The rhachidians of the radular ribbon are laterally excavated, convex or concave at the top, convex at base of plate, broader than they are long, and with a prominent long or short central cusp and 4-5 smaller cusps at either side. Laterals with 5-8 accessory cusps on cutting edge of large cusp, inner and outer marginals simple, and without cusps.

1. *Cymatium caudatum* (GMELIN, 1791)

(Plate 45, Figure 20; Text figure 7)

1791. *Murex caudatus* GMELIN, Syst. Nat., ed. 13, p. 3535 (non *Cymatium caudatum* RÖDING, 1798)

1822. *Triton canaliferum* LAMARCK, Anim. sans Vert., 7: 184

**Shell:** Shell moderate in size, solid and with a long anterior canal; white in colour, sparsely blotched on varices, nodules and body whorl with orange-brown. Whorls number 4 apart from protoconch of 4 glassy-brown nuclear whorls; one varix is positioned at every whorl. Body



Figure 7

Operculum of *Cymatium caudatum* (GMELIN). Fiji Islands.

## Explanation of Plate 42

Figure 1: *Bursa bubo* (LINNAEUS). Fiji. x 0.4

Figure 2: *Bursa* species. Fiji. x 1.0

Figure 3: *Bursa rosa* PERRY. Fiji. x 1.7

Figure 4: *Bursa bufonia* (GMELIN). Fiji. x 1.0

Figure 5: *Bursa nobilis* (REEVE). Fiji. x 1.3

Figure 6: *Bursa granularis* (RÖDING). Fiji. x 1.5



Figure 1

Figure 2

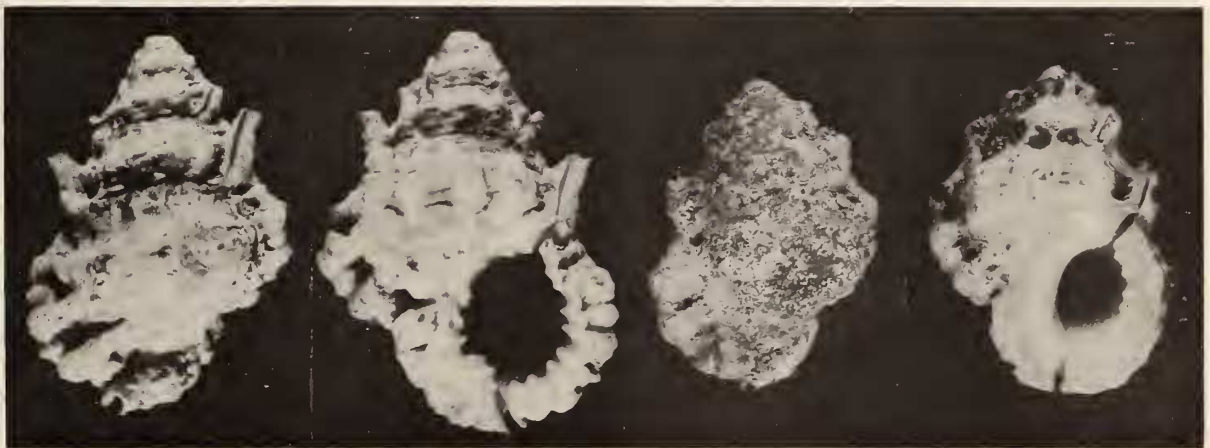


Figure 3

Figure 4

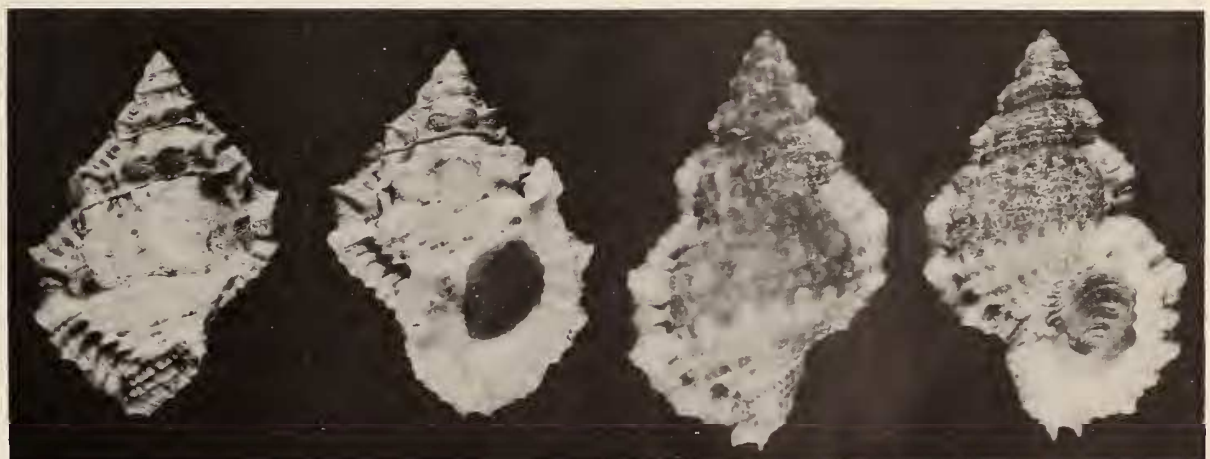
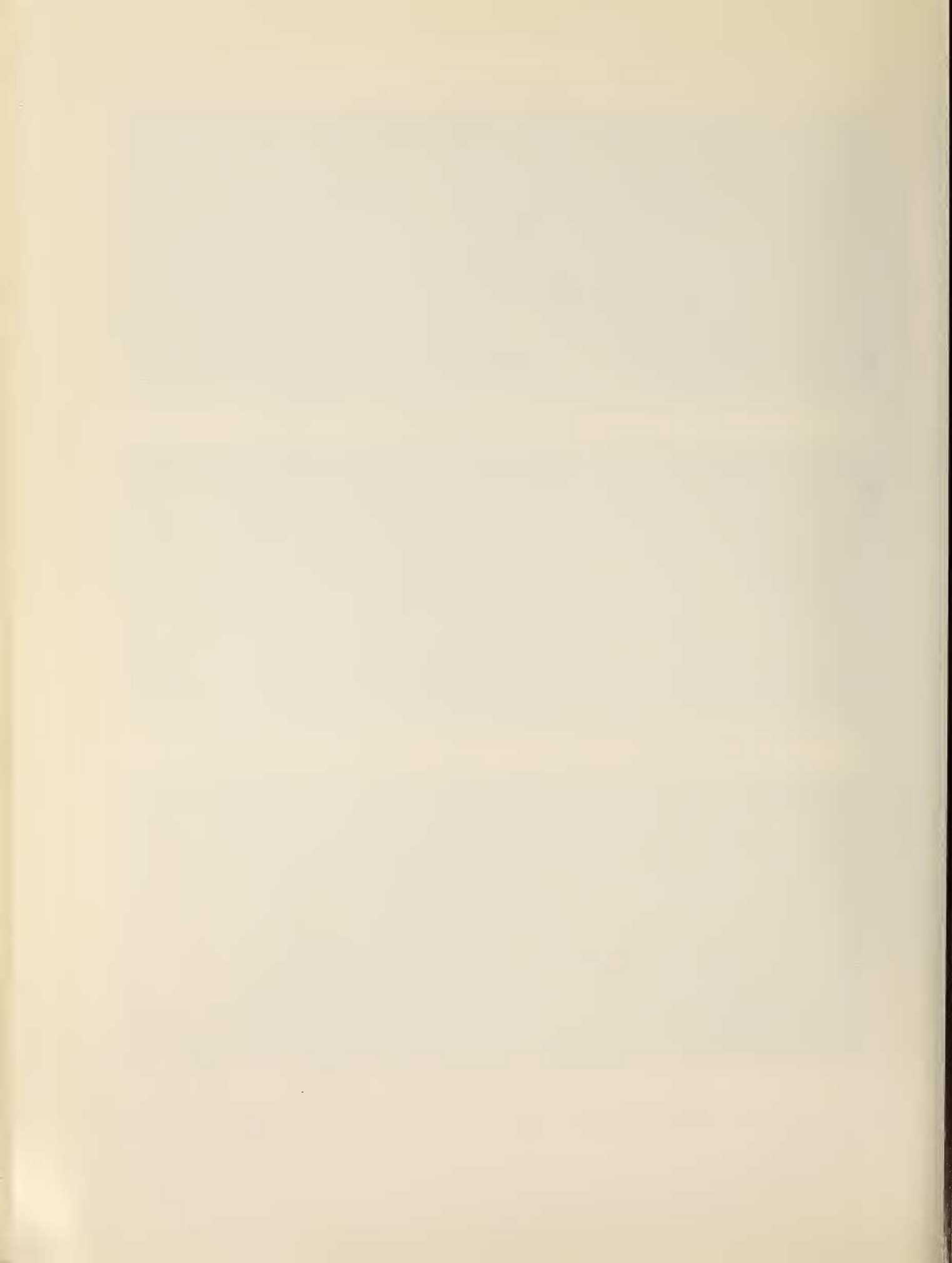


Figure 5

Figure 6





whorl with 4 - 6 prominent and angulate knobs between varices, and 11 - 17 prominent spiral cords and smaller intermediate cords; close-set axial ridges extend from suture to suture and override axial ribs and interstices. Aperture bright red, deep interior white; outer lip thickened, bright orange-red, ornamented with about 7 prominent denticles which extend a short way towards the interior of the aperture. Columella calloused, sculptured with 3 - 5 denticles, columellar wall smooth on outer edge but with 6 - 9 spiral plicae in interior, parietal wall with 3 - 4 strong plicae. Anal canal almost obsolete, siphonal canal long, slender and twisted; the twist in the siphonal canal can be either to the left or to the right.

**Size:** 40 to 66 mm.

**Habitat:** Dredged on sand and coral substrate, from 0 to 3 fathoms.

Rare.

**Distribution:** Throughout the Fiji Islands. - From Indonesia to Japan and the Fiji Islands.

## 2. *Cymatium gemmatum* (REEVE, 1844)

(Plate 44, Figure 17)

1844. *Triton gemmatum* REEVE, Conch. Icon., *Triton*, pl. 15, sp. 60  
1849. *Triton mundum* GOULD, Proc. Bost. Soc. Nat. Hist. 6: 143  
1936. *Septa blacketi* IREDALE, Rec. Austral. Mus., 19: 307, pl. 23, fig. 3

**Shell:** Shell small but fairly solid; creamy-white or yellow in colour, occasionally ornamented with light narrow bands and yellow flecks. Whorls angulate, numbering 6 apart from protoconch; there are 1 - 2 varices at every whorl, and 2 - 3 knobs positioned between varices on body whorl. Body whorl sculptured with 15 - 27 spiral ridges of varying size, which extend to the siphonal canal; spiral ridges are clathrate by 45 - 60 moderately prominent axial riblets which override spiral cords; penultimate whorl with 3 - 5 spiral ridges. Aperture white, outer lip with 10 - 15 prominent white denticles; columella white, with 13 - 14 white denticles which become plicae on the columellar wall. Parietal wall with one prominent white denticle. Siphonal canal only moderately produced, anal canal moderately deep, interior of aperture porcelain-white.

Periostracum light yellow, smooth, and only with short hairy projections on varices.

**Size:** 18 to 31 mm.

**Habitat:** Under coral boulders, on sand and coral substrate, in shallow and deeper water.

Uncommon.

**Distribution:** Throughout the Fiji Islands. - From Mauritius throughout the tropical Indo-Pacific to Polynesia and the Hawaiian Islands.

## 3. *Cymatium hepaticum* (RÖDING, 1798)

(Plate 44, Figure 14)

1798. *Tritonium hepaticum* RÖDING, Mus. Bolten., p. 126

1807. *Tritonium rubecula* LINK (pars), Besch. Nat.-Samml. Univ. Rostock, p. 122 (non *Murex rubecula* LINNAEUS, 1758)

**Shell:** This species resembles *Cymatium rubeculum* (LINNAEUS) very closely, but it is reddish-brown or reddish-tan in colour and ornamented with 6 - 8 blackish transverse bands in the interstices of spiral ridges, and small white patches appear on varices. The interstices of the labial denticles are coloured reddish-orange, whereas they are white in *C. rubeculum*. The interstices of the spiral ridges are sculptured with 2 - 4 fine spiral ridges; in all other characters the species approaches *C. rubeculum*.

**Size:** 30 to 51 mm.

**Habitat:** Under coral rocks, on sand and coral substrate, in shallow and deeper water.

Moderately rare.

**Distribution:** Throughout the Fiji Islands. - From the Philippine Islands to Polynesia.

## 4. *Cymatium labiosum* (WOOD, 1828)

(Plate 43, Figure 8)

1828. *Murex labiosus* WOOD, Ind. Test., Suppl., p. 15, pl. 5, fig. 18

1843. *Tritonium rutilum* MENKE, Mollusc. Nov. Holl. Spec., p. 25

**Shell:** Shell small and solid; dark rusty-brown in colour, ornamented with one or two obsolete spiral bands in the interstices of spiral ridges on the body whorl. Whorls angulate, numbering 4 - 5 apart from protoconch; there is one varix at every whorl, and 3 - 4 prominent knobs are situated between varices and are connected to sutures by strong axial cords. Body whorl sculptured with 4 - 6 main spiral cords, penultimate whorl with 2 cords; intermediate finely beaded spiral ridges are situated between main cords, interstices of ridges are axially grooved and spirally striate. Aperture white and oval, outer lip produced, ornamented with 6 prominent and blunt white denticles which extend partly towards the interior of the aperture; columellar wall smooth and white, parietal wall with one denticle; anal canal almost obsolete, siphonal canal moderately short.

**Size:** 28 to 34 mm.

**Habitat:** Unknown. Known from collection of dead specimens only.

Rare.

**Distribution:** South Viti Levu. – Indonesia, Japan, Philippines and Kermadec Islands.

5. *Cymatium muricinum* (RÖDING, 1798)

(Plate 44, Figure 18; Text figure 8)

1798. *Distorsio muricina* RÖDING, Mus. Bolten., p. 133

1807. *Tritonium nodulus* LINK, Besch. Nat.-Samml. Univ. Rostock, p. 122

1822. *Triton tuberosum* LAMARCK, Anim. sans Vert., 7: 185 (non *Tritonium tuberosum* RÖDING, 1798)

1849. *Triton pyriformis* CONRAD, Journ. Acad. Sci. Philad. 2(1): 211

**Shell:** Shell moderate in size, solid and fairly heavy; dirty white or light grey in colour, sometimes with lighter or darker areas on body whorl. Whorls angulate, numbering about 6 apart from protoconch; there are 2 varices at every whorl, and 3-5 prominent knobs are positioned between varices on the body whorl. Sculpture consists of 15-17 spiral ridges on the body whorl, of which about 7 are generally more prominent; penultimate whorl with 5 to 10 spiral ridges and obsolete axial striae. Outer lip calloused, creamy-white in colour, ornamented with 6-7 coarse white denticles which extend for a short distance into the aperture; columella heavily calloused, creamy-white, with 4-9 columellar plicae which become somewhat obsolete on the columellar wall; parietal wall with 1 or 2 denticles. Siphonal canal moderately slender and produced, recurved towards dorsum; interior of aperture purplish brown.

**Animal:** Foot creamy-yellow, ornamented with numerous light grey spots, edges of foot marked with larger trigonal and oblong rusty-brown spots. Siphon translucent white, edges adorned with brown round and oblong spots.

**Radula:** Radular ribbon translucent-white, 2.6mm long and 0.19mm wide in an animal with a shell 37.0mm in length; fully formed rows number 65 (+ 8 nascentes), and some wear was discernible on the first half dozen rows of teeth. Rhachidians broader than long, concavely excavated at sides and base, and with a moderately long

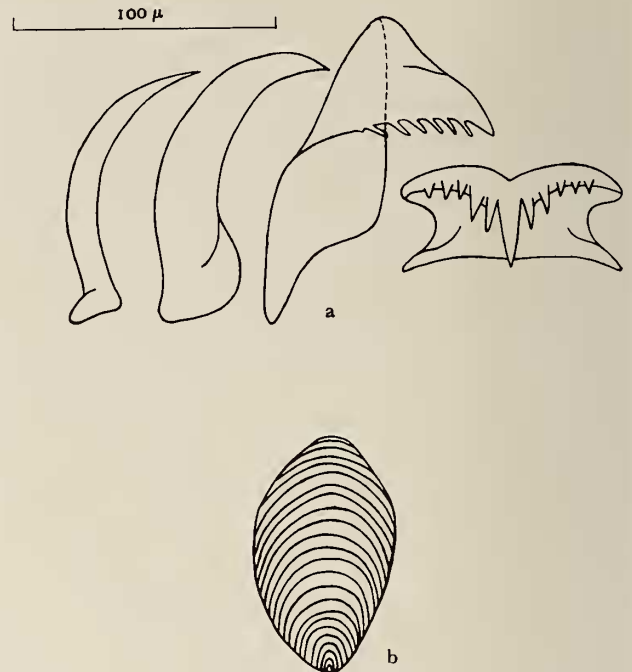


Figure 8

*Cymatium muricinum* (RÖDING). Fiji Islands.

a. Half Row of Radular Teeth

b. Operculum

central cusp which is flanked by 5 accessory cusps on either side. Laterals with a broad cutting cusp which bears 6-7 slender accessory cusps on the cutting edge; inner and outer marginals simple and without accessory cusps.

**Size:** 30 to 65 mm.

**Habitat:** Under coral rocks, on sand and coral substrate, often in muddy sand localities, in shallow water.

Common.

**Distribution:** Throughout the Fiji Islands. – From East Africa through the tropical Indo-Pacific to Polynesia, the Hawaiian Islands, Florida and the West Indies.

Explanation of Plate 43

Figure 7: *Bursa cruentata* (SOWERBY). Fiji. x 2.0

Figure 8: *Cymatium labiosum* (WOOD). Fiji. x 2.0

Figure 9: *Bursa rhodostoma* (SOWERBY). Fiji. x 3.0

Figure 10: *Cymatium pileare* (LINNAEUS). Fiji. x 1.0

Figure 12: *Cymatium nicobaricum* (RÖDING). Fiji. x 1.0

Figure 10a: *Cymatium pileare* (LINNAEUS). – periostracum removed. Fiji. x 1.0

Figure 11: *Bursa granularis* (RÖDING). – sculptural variant. Fiji. x 1.4



Figure 7

Figure 8

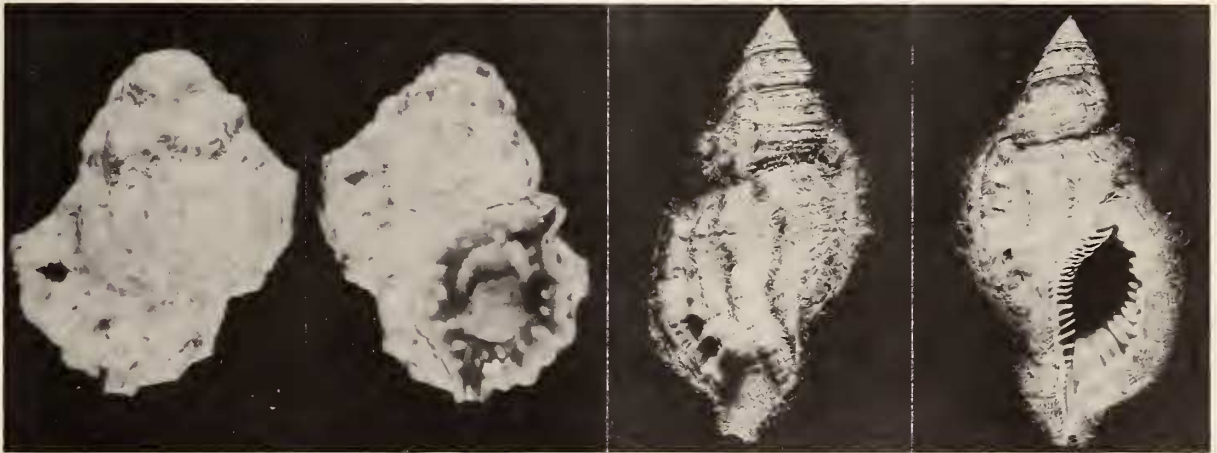


Figure 9

Figure 10

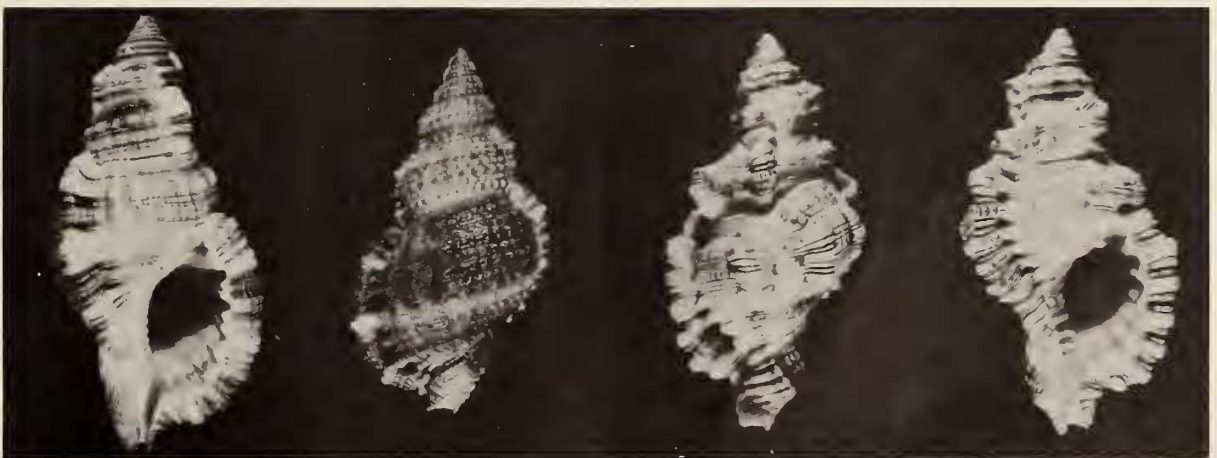


Figure 10 a

Figure 11

Figure 12



6. *Cymatium nicobaricum* (RÖDING, 1798)

(Plate 43; Figure 12; Text figure 9)

1798. *Tritonium nicobaricum* RÖDING, Mus. Bolten., p. 1261807. *Tritonium lotorium* LINK, Besch. Nat.-Samml. Univ. Rostock, p. 122 (non *Murex lotorium* LINNAEUS, 1758)

**Shell:** Shell moderate in size, fairly solid; creamy-white in colour, irregularly flecked and lined with rusty-brown. Whorls angulate, numbering 4 - 6 apart from protoconch of 4 light-brown glassy nuclear whorls; there are two varices at every whorl and 3 - 5 prominent knobs are positioned between varices. Sculpture consists of close-set flattish spiral ridges numbering from 20 - 32 on the body whorl and from 10 - 13 on the penultimate whorl; spiral ridges are of varying widths and are bisected by obsolete axial ridges forming weak nodules on spiral cords; these

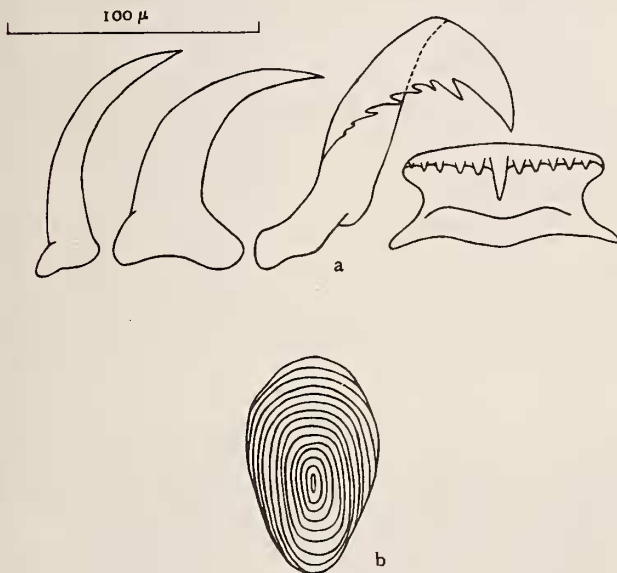


Figure 9

*Cymatium nicobaricum* (RÖDING). Fiji Islands.

a. Half Row of Radular Teeth

b. Operculum

nodules are occasionally spotted with brown. Aperture orange or reddish-orange, outer edge of labial lip white and ornamented with 7 - 14 white denticles; columella orange in colour, sculptured with 11 - 19 denticles which extend as plicae towards the parietal wall. Siphonal canal only moderately produced.

**Radula:** Radular ribbon translucent white, 3.2 mm long and 0.21 mm wide in an animal with a shell 44.0 mm in

length; fully formed rows number 101 (+ 7 nascentes) and some wear was discernible on anterior rows of teeth. Rhachidian broader than long, concavely excavated centrally, and with a moderate-sized central cusp which is flanked by 4 - 5 side cusps. Laterals with 5 - 7 denticles on cutting edge, marginals sickle-shaped and without accessory denticles.

**Size:** 24 to 77 mm.

**Habitat:** Under coral rocks, on reef substrate, in shallow water.

Common.

**Distribution:** Throughout the Fiji Islands. - From Mauritius through the tropical Indo-Pacific to Polynesia, the Hawaiian Islands, Florida and the West Indies.

7. *Cymatium pileare* (LINNAEUS, 1758)

(Plate 43, Figures 10, 10 a; Text figure 10)

1758. *Murex olearium* LINNAEUS (pars), Syst. Nat., ed. 10, p. 7481758. *Murex pileare* LINNAEUS, Syst. Nat., ed. 10, p. 7491844. *Triton aquatilis* REEVE, Conch. Icon., Triton, pl. 7, sp. 241844. *Triton vestitus* HINDS, Proc. Zool. Soc. London, pt. 12, : 211845. *Triton martinianum* D'ORBIGNY, Hist. pol. nat. Isl. Cuba, 5: 2491869. *Triton intermedius* PEASE, Amer. Journ. Conch., 5: 74 (juvenile)1878. *Triton veliei* CALKINS, Proc. Dav. Acad. Nat. Sci. 2: 235, pl. 2, figs. 1, 2

**Shell:** Shell moderately large and solid; creamy white or creamy-yellow in colour, irregularly ornamented with brown transverse bands and axial streaks. Whorls convex, numbering from 6 - 7 apart from protoconch of 4 creamy-white or light fawn glassy nuclear whorls; body whorl and penultimate whorl with 2 varices per whorl, 6 - 10 knobs between varices, and numerous beaded spiral cords and axial ridges. Aperture orange to reddish-orange, outer lip with 14 - 17 white denticles which are often arranged in pairs and extend as white plicae into the aperture; columella calloused, deep red or purplish-brown, ornamented with 22 - 30 white plicae which extend as far as the parietal wall. Siphonal canal only moderately produced and recurved.

Periostracum light brown in colour, with long brown hairy projections on varices.

**Animal:** Dorsum of foot white, ornamented with cylindrical, hexagonal or round rusty-brown spots, some larger than others. Tentacles whitish, underside translucent light grey; siphon is of the same pattern as the foot on the underside, top is translucent-white.

**Radula:** Radular ribbon white, 3.0 mm long and 0.23 mm wide in an animal with a shell 45.0 mm in length; fully

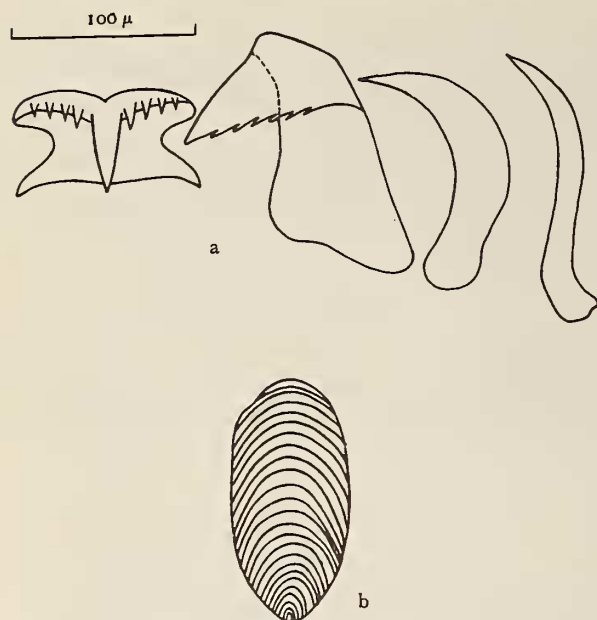


Figure 10

*Cymatium pileare* (LINNAEUS). Fiji Islands.

a. Half Row of Radular Teeth

b. Operculum

formed rows number 61 (+ 7 nascentes), and appreciable wear is evident in anterior rows of the ribbon. Rhachidian laterally deeply excavated, equipped with a massive central cusp and 4 accessory cusps at the sides. Laterals broad, with 6 accessory cusps on cutting edge; inner and outer marginals simple and without accessory cusps.

**Size:** 37 to 103 mm.

**Habitat:** Under coral rocks, on sand and coral substrate, in shallow water.

Common.

**Distribution:** Throughout the Fiji Islands. - From the Red Sea through the tropical Indo-Pacific to Polynesia, the Hawaiian Islands, and the Caribbean region.

**Discussion:** LINNAEUS' (1758) habitat indication "*M. Mediterraneo*" is incorrect.

#### 8. *Cymatium pyrum* (LINNAEUS, 1758)

(Plate 45, Figure 19)

1758. *Murex pyrum* LINNAEUS, Syst. Nat., ed. 10, p. 749

1798. *Cymatium clavatum* RÖDING, Mus. Bolten., p. 129  
 1798. *Cymatium canaliculatum* RÖDING, Mus. Bolten., p. 129  
 1798. *Cymatium caudatum* RÖDING, Mus. Bolten., p. 129 (non *Murex caudatus* GMELIN, 1791)  
 1798. *Cymatium flexuosum* RÖDING, Mus. Bolten., p. 129  
 1798. *Cymatium muricatum* RÖDING, Mus. Bolten., p. 130

**Shell:** Shell moderately large, heavy and solid; reddish-orange in colour, irregularly mottled with white on varices. Whorls angulate, numbering 5 - 6 apart from protoconch of 2 whitish nuclear whorls; 2 varices are situated at each whorl, and about 5 prominent and angulate knobs are positioned between varices. Body whorl sculptured with 14 - 15 spiral cords, about 6 of which are heavy ridges, penultimate and earlier whorls with 2 - 3 strong cords; numerous close-set and finely beaded spiral cords are interspersed between the heavy cords, and interstices are finely axially striate. Outer lip with about 7 - 8 prominent reddish-orange denticles which extend as strong white plicae towards the interior of the aperture; interstices of denticles reddish-orange. Columella with 16 to 18 strong white plicae, 1 denticle at parietal wall, interstices orange-red. Anal canal almost obsolete, Siphonal canal thickened, moderately long, twisted and recurved; interior of aperture white.

**Size:** 60 to 95 mm.

**Habitat:** Unknown. Known from collection of dead but well-preserved specimens.

Rare.

**Distribution:** South Viti Levu and the Yasawa Islands. Throughout the tropical Pacific.

#### 9. *Cymatium rubeculum* (LINNAEUS, 1758)

(Plate 44, Figure 13; Text figure 11)

1758. *Murex rubecula* LINNAEUS, Syst. Nat., ed. 10, p. 749  
 1798. *Tritonium limbatum* RÖDING, Mus. Bolten., p. 126  
 1798. *Tritonium flaveola* RÖDING, Mus. Bolten., p. 127  
 1811. *Septa scarlatina* PERRY, Conchology, pl. 14, fig. 2  
 1816. *Triton nubecula* [sic] LAMARCK, Tabl. Encycl. Méth., p. 4, pl. 413, figs. 2 a, 2 b

**Shell:** Shell moderately small and rather solid; variable in colour, but generally bright or dark red, ornamented with an occasional whitish or yellowish transverse band on body whorl and small patches of white on varices. Shell with 6 convex whorls, one varix at each whorl,

### Explanation of Plate 44

- Figure 13: *Cymatium rubeculum* (LINNAEUS). Fiji. x 1.7  
 Figure 14: *Cymatium hepaticum* (RÖDING). Fiji. x 1.7  
 Figure 15: *Cymatium vespaceum* (LAMARCK). Fiji. x 1.8

- Figure 16: *Cymatium* cf. *C. gracile* (REEVE). Fiji. x 1.9  
 Figure 17: *Cymatium gemmatum* (REEVE). Fiji. x 2.4  
 Figure 18: *Cymatium muricinum* (RÖDING). Fiji. x 1.2



Figure 13

Figure 14



Figure 15

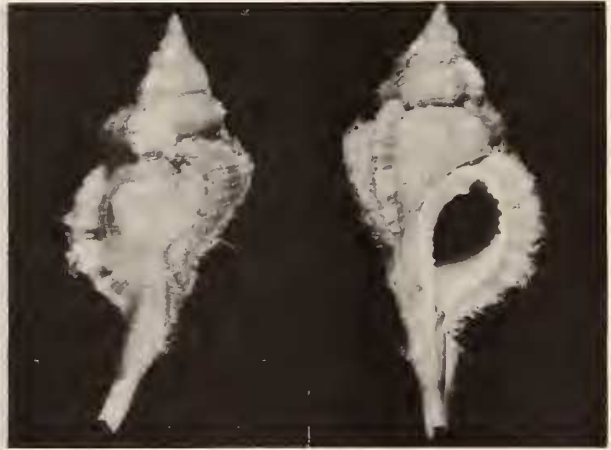


Figure 16



Figure 17

Figure 18





protoconch with 3 - 3½ white, glassy and smooth nuclear whorls; body whorl sculptured with 10 - 16 beaded spiral lirae, penultimate whorl with 3 - 4 lirae; axial grooves descend onto the spiral ridges, and interstices are sculptured with 2 - 4 rows of minute crenules. Outer lip thickened, ornamented with 8 - 10 prominent white denticles which extend towards the interior of the aperture; columella reddish and with 14 - 18 white plicae extending towards the interior of the aperture and siphonal canal. Interior of aperture white or bluish-white, siphonal canal moderately short and recurved.

Periostracum yellowish-brown, tufted, arranged in longitudinal rows following axial striae.



Figure 11

Operculum of *Cymatium rubeculum* (LINNAEUS). Fiji Islands.

In juvenile shells 4 fully formed and 4 nuclear whorls were counted; nuclear whorls were crimson in colour, with the ultimate two nuclear whorls finely spirally striate.

Size: 20 to 50 mm.

Habitat: Under coral rocks, on coral substrate, in shallow water.

Uncommon.

Distribution: Throughout the Fiji Islands. - From East Africa through the tropical Indo-Pacific to Polynesia and the Hawaiian Islands.

#### 10. *Cymatium vespacum* (LAMARCK, 1822)

(Plate 44, Figure 15)

1822. *Triton vespacum* LAMARCK, Anim. sans Vert., 7: 185

1932. *Cymatium vespacum* [sic] TURTON, Mar. shells Prt. Alfred p. 111

Shell: Shell moderately small, light in weight, spire recurved; fawn to blackish-brown in colour, ornamented with a yellow or whitish peripheral band on body whorl and at sutures; some ridges are lighter coloured and occasional ridges on varices are mottled with white. Whorls angulate, numbering 5 - 6 apart from protoconch;

whorls with one prominent varix, early whorls and penultimate whorl with 2 main elevated spiral ridges and finer intermediate beaded spiral lirae. Body whorl with 25 - 30 spiral ridges and numerous fine axial striae which bisect ridges to form small beads at the summits. Outer lip with 14 - 16 white denticles arranged in pairs; columella whitish and with 12 - 15 white denticles which become plicae on columellar wall; denticle on parietal wall generally prominent. Anal canal only moderately pronounced, siphonal canal slender and moderately long, interior of aperture light greyish-brown.

Size: 26 to 43 mm.

Habitat: Dredged on coral and sand substrate in 7 fathoms.

Moderately rare.

Distribution: Throughout the Fiji Islands. - From South Africa to Polynesia.

#### 11. *Cymatium cf. gracile* (REEVE, 1844)

(Plate 44, Figure 16)

1844. *Triton gracilis* REEVE, Conch. Icon., *Triton*, pl. 15, figs. 58 a, 58 b

Shell: Shell moderately small and light in weight; orange-brown in colour, ornamented with an occasional white spiral ridge on body whorl and varices. Whorls convex, numbering 5 apart from protoconch of 4 glassy-fawn smooth nuclear whorls which are encircled by a faint white transverse band; shell with 2 varices at every whorl, and 2 - 4 knobs or elevated axial ridges are situated between varices. Body whorl with about 25 finely beaded spiral ridges and about 9 such ridges on the penultimate whorl. Interstices of spiral cords with wide-spaced axial grooves and 1 - 2 minute spiral lirae and pittings. Outer lip white, sculptured with 17 small denticles which are arranged in pairs; columella white and calloused, ornamented with 15 prominent white denticular plicae which extend towards the interior of the aperture; one prominent denticle is situated on the parietal wall. Siphonal canal slender, twisted and moderately produced, anal canal obsolete, interior of aperture brownish.

Periostracum yellowish-brown and smooth, except on varices where hairy projections of varying size are visible.

Size: 42 to 46 mm.

Habitat: Dredged in 5 - 8 fathoms on sand and coral rubble substrate.

Very rare.

Distribution: South and West Viti Levu.

Discussion: This species also resembles in some respect *Cymatium pfeifferianum* (REEVE, 1844), a species which

has been recorded from South Africa to the Hawaiian Islands.

*Gyrineum* LINK, 1807

*Gyrineum* LINK, 1807, Besch. Nat.-Samml. Univ. Rostock, p. 123  
- Type species by SD (DALL, 1904) *Gyrineum verrucosum*  
LINK, 1807 = *Gyrineum gyrinum* (LINNAEUS, 1758)

**Characters:** Shells small to moderate in size, flatly compressed, whorls convex, varices continuous and vertically aligned, occasionally wing-like, sculptured with spiral rows of nodules. Aperture shorter than the spire, roundly ovate to obliquely oval, labrum and columella denticulate or plicate; anal canal obsolete, siphonal canal short or moderately produced and recurved. Periostracum orange-brown, moderately thin and with hair-like projections on varices.

Operculum orange-brown to brown, moderately thin, ovate, occasionally angulate anteriorly, nucleus terminal and at edge of margin.

Animal similar to other Cymatiidae.

Rhachidians of radular ribbon almost quadrate, only slightly broader than long, concave at base and concavely excavated towards top of plate; central cusp only moderately long, with 5 - 6 very small denticles at either side; laterals broad, inner and outer marginals simple, with or without accessory cusps on cutting edge.

**Discussion:** ROVORETO's type-designation in 1899 of *Gyrineum spinosum* (DILLWYN, 1817) as type species of *Gyrineum* LINK, 1807 is invalid, as this species was not among the originally included species of the genus. The type species of *Apollon* MONTFORT, 1810 is *A. gyrinus* (= *Murex gyrinus* LINNAEUS), and the genus is therefore synonymous with *Gyrineum* LINK. The species *Gyrineum spinosum* (= *G. echinatum* LINK, 1807) belongs to the genus *Bufo* SCHUMACHER, 1817.

12. *Gyrineum gyrinum* (LINNAEUS, 1758)

(Plate 45, Figure 21; Text figure 12)

1758. *Murex gyrinus* LINNAEUS, Syst. Nat., ed. 10, p. 748

1807. *Gyrineum verrucosum* LINK, Besch. Nat.-Samml. Univ. Rostock, p. 123 (non *Tritonium verrucosum* LINK, 1808; nec *Ranella verrucosa* SOWERBY, 1836)

1816. *Ranella ranina* LAMARCK, Tabl. Encycl. Méth., p. 4, pl. 412, figs. 2a, 2b

**Shell:** Shell moderately small, depressed, fairly light in weight; basic colour white or creamy-white, ornamented with 2 - 3 blackish transverse bands on body whorl and a single band on preceding whorls; nodules and parts of varices mottled with yellow or orange. Whorls convex, numbering from 6 - 7 apart from protoconch of 2 nuclear whorls; two varices at every whorl, varices in vertical alignment. Sculpture consists of 9 - 11 spiral rows of wide-spaced rounded beads on body whorl, and 4 rows of beads on penultimate whorl; finer spiral and axial striae are situated in interstices. Aperture white, outer lip with 7 - 8 denticles; columella slightly calloused and with 12 - 16 weak plicae which terminate in two coarse denticular plicae on parietal wall. Siphonal canal moderately short, interior of aperture white or bluish-white.

**Animal:** Foot cream in colour, tentacles small and broad at base, variegated with dark fawn and spotted with white, eyes dark purple. Proboscis very thick (7.4 mm long and 3.5 mm wide), cream coloured, flecked with fawn and white.

Penis club-shaped, yellow in colour, axially streaked with fawn, 6.0 mm long in an animal with a shell 25.0 mm in length.

**Radula:** Radular ribbon translucent white, 10.5 mm long and 0.7 mm wide in an animal with a shell 25.0 mm in length; fully formed rows number 59 (+ 4 nascentes), and wear is discernible in the first 10 anterior rows of teeth. Rhachidian roughly trapezoidal, equipped with one moderately large cusp which is flanked by 5 - 6 very small accessory cusps. Lateral broad and with a long cutting cusp, inner and outer marginals sickle-shaped; laterals and marginals lack accessory cusps on cutting edge.

**Size:** 20 to 46 mm.

**Habitat:** Under coral rocks, on sand and coral substrate, in shallow water; preferred habitats are muddy-sand localities.

Moderately common.

**Distribution:** Throughout the Fiji Islands. - From Indonesia to Polynesia.

**Discussion:** LINNAEUS' habitat indication "*M. Mediterraneo*" is incorrect.

The radula confirms the placing of the species in the family Cymatiidae, not in the Bursidae. The radula is basically of the same pattern as that of *Argobuccinum argus* (GMELIN, 1791) [= *Gyrineum pustulosum* (SOLLANDER in LIGHTFOOT, 1786)] as figured by BARNARD

Explanation of Plate 45

Figure 19: *Cymatium pyrimum* (LINNAEUS). Fiji. x 1.0  
Figure 20: *Cymatium caudatum* (GMELIN). Fiji. x 1.2  
Figure 21: *Gyrineum gyrinum* (LINNAEUS). Fiji. x 2.0

Figure 22: *Gyrineum pusillum* (BRODERIP). Fiji. x 1.0  
Figure 23: *Distorsio anus* (LINNAEUS). Fiji. x 1.0  
Figure 24: *Distorsio reticulata* RÖDING. Fiji. x 1.0

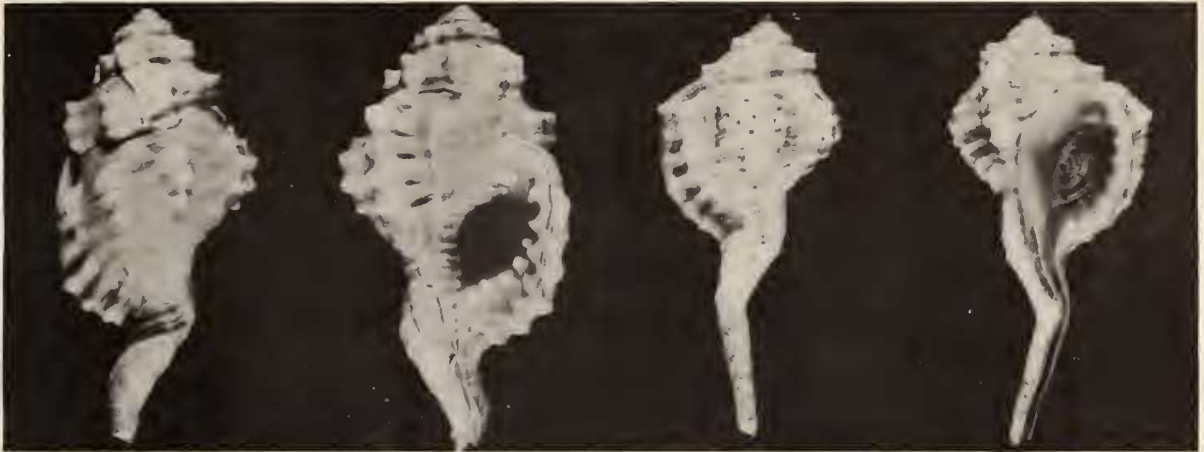


Figure 19

Figure 20

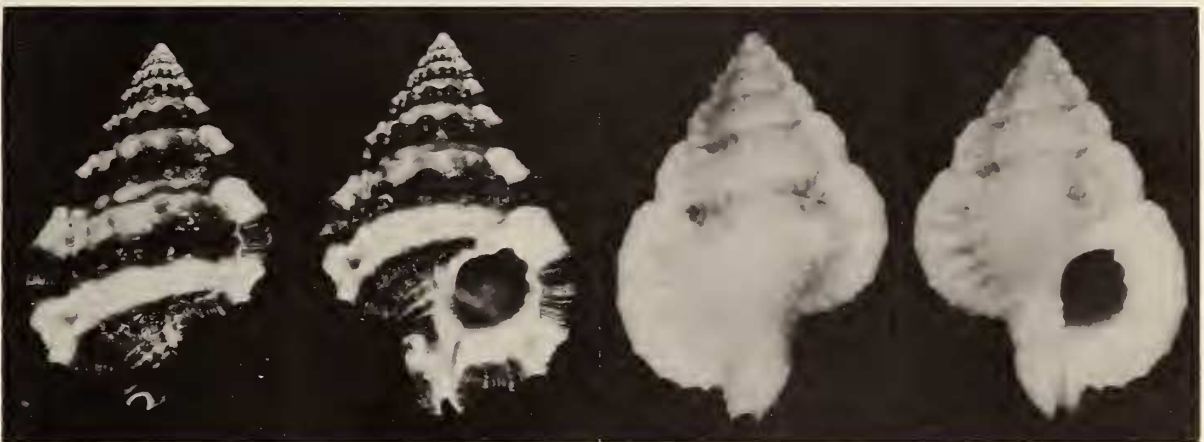


Figure 21

Figure 22

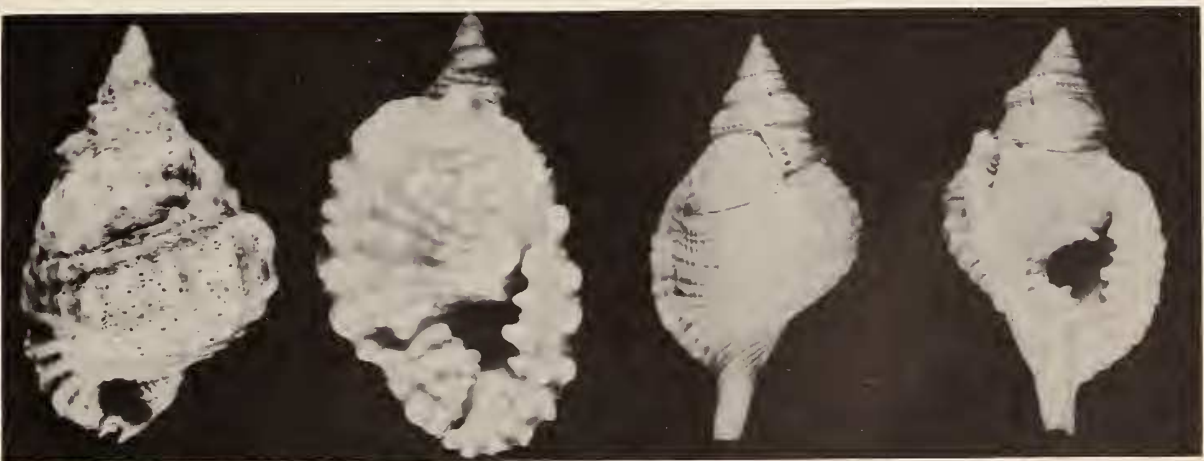


Figure 23

Figure 24